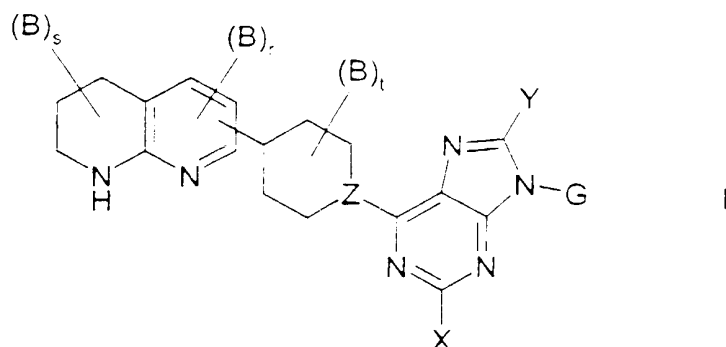


## Patent claims

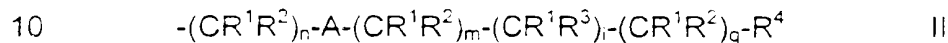
1. A compound of the formula I,



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in which

G is a residue of the formula II



A is a direct bond,  $-C(O)NR^5$ -,  $-NR^5C(O)$ -,  $-C(O)$ -,  $-NR^5$ -,  $-O$ -,  $-S$ -,  $-S(O)$ -,  $-S(O)_2$ -,  $(C_2-C_4)$ -alkynediyl,  $(C_2-C_4)$ -alkenediyl,  $(C_5-C_{14})$ -arylene where in the arylene residue one, two, three, four or five ring carbon atoms can be replaced by heteroatoms from the series consisting of nitrogen, oxygen and sulfur, or a divalent residue of a 3-

15 membered to 7-membered saturated or unsaturated ring which can contain one or two ring heteroatoms from the series consisting of nitrogen, sulfur and oxygen and which can be monosubstituted or disubstituted by residues from the series consisting of  $=O$ ,  $=S$  and  $R^3$ ;

20

B is  $(C_1-C_{18})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -aryl,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -heteroaryl,  $(C_5-C_{14})$ -heteroaryl- $(C_1-C_8)$ -alkyl-, fluorine, chlorine, bromine, hydroxy, cyano, trifluoromethyl, nitro, hydroxycarbonyl-,  $(C_1-C_6)$ -alkoxy,  $(C_1-C_6)$ -alkoxy- $(C_1-C_6)$ -alkyl-,  $(C_1-C_6)$ -alkoxycarbonyl-,  $(C_1-C_6)$ -alkylcarbonyl-,  $(C_5-C_{14})$ -arylcarbonyl-,  $(C_1-C_6)$ -alkylaminocarbonyl-,  $(C_1-C_6)$ -alkoxy-

25  $(C_1-C_6)$ -alkoxy-,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkylcarbonyl-,  $(C_1-C_6)$ -alkanoylamino-,  $(C_1-C_6)$ -

alkylsulfonylamino-, (C<sub>5</sub>-C<sub>14</sub>)-arylsulfonylamino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino-, di-((C<sub>1</sub>-C<sub>6</sub>)-alkyl)amino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylsulfonyl-, aminosulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-arylsulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkylsulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl or (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, where all residues B are independent of one another and can be identical or different;

5

X is hydrogen, NR<sup>6</sup>R<sup>6'</sup>, fluorine, chlorine, bromine, OR<sup>6</sup>, SR<sup>6</sup>, hydroxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-NH-, (hydroxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl)<sub>2</sub>N-, amino-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-NH-, (amino-(C<sub>1</sub>-C<sub>6</sub>)-alkyl)<sub>2</sub>N-, hydroxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-O-, hydroxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-S- or -NH-C(O)-R<sup>6</sup>;

10 Y is R<sup>6</sup>, fluorine, chlorine, bromine, cyano, NR<sup>6</sup>R<sup>6'</sup>, OR<sup>6</sup>, SR<sup>6</sup> or hydroxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-NH-;

Z is N or CH;

15 R<sup>1</sup> and R<sup>2</sup> are hydrogen, fluorine, chlorine, cyano, nitro, (C<sub>1</sub>-C<sub>10</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, R<sup>6</sup>-O-R<sup>7</sup>, R<sup>6</sup>-S(O)<sub>p</sub>-R<sup>7</sup>, R<sup>6</sup>S(O)<sub>2</sub>NHR<sup>7</sup>, R<sup>6</sup>OC(O)NHR<sup>7</sup> or R<sup>6</sup>R<sup>6'</sup>N-R<sup>7</sup>, where all residues R<sup>1</sup> and R<sup>2</sup> are independent of one another and can be identical or different;

20

R<sup>3</sup> is hydrogen, fluorine, chlorine, cyano, nitro, (C<sub>1</sub>-C<sub>18</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, R<sup>6</sup>-O-R<sup>7</sup>, R<sup>6</sup>R<sup>6'</sup>N-R<sup>7</sup>, R<sup>6</sup>C(O)-O-R<sup>7</sup>, R<sup>6</sup>C(O)R<sup>7</sup>, R<sup>6</sup>OC(O)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)OR<sup>7</sup>, R<sup>6</sup>S(O)<sub>p</sub>N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>OC(O)N(R<sup>5</sup>)R<sup>7</sup>,

25 R<sup>6</sup>C(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)S(O)<sub>p</sub>N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>S(O)<sub>p</sub>R<sup>7</sup>,

R<sup>6</sup>SC(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)R<sup>7</sup> or R<sup>6</sup>N(R<sup>6'</sup>)S(O)<sub>p</sub>R<sup>7</sup>, where alkyl can be mono-unsaturated or poly-unsaturated and where alkyl, cycloalkyl, aryl, and heteroaryl can be monosubstituted or polysubstituted by R<sup>6</sup>, fluorine, chlorine, bromine, cyano, trifluoromethyl, R<sup>6</sup>R<sup>6'</sup>NR<sup>7</sup>, nitro, R<sup>6</sup>OC(O)R<sup>7</sup>, R<sup>6</sup>C(O)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)R<sup>7</sup>,

30 R<sup>6</sup>N(R<sup>6'</sup>)S(O)<sub>p</sub>R<sup>7</sup> or R<sup>6</sup>-O-R<sup>7</sup>, and where all residues R<sup>3</sup> are independent of one another and can be identical or different;

$R^4$  is  $-C(O)R^8$ ,  $-C(S)R^8$ ,  $-S(O)_pR^8$ ,  $-P(O)R^8R^8$  or a residue of a 4-membered to 8-membered saturated or unsaturated heterocycle which contains 1, 2, 3 or 4 heteroatoms from the series consisting of nitrogen, oxygen and sulfur;

5

$R^5$  is hydrogen,  $(C_1-C_{10})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -aryl or  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-, where all residues  $R^5$  are independent of one another and can be identical or different;

- 10  $R^6$  and  $R^{6'}$  are hydrogen,  $(C_1-C_{18})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -aryl,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -heteroaryl or  $(C_5-C_{14})$ -heteroaryl- $(C_1-C_8)$ -alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be substituted one, two or three times by identical or different substituents from the series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl, nitro,
- 15 hydroxycarbonyl-,  $(C_1-C_6)$ -alkyl,  $(C_1-C_6)$ -alkoxy,  $(C_1-C_6)$ -alkoxy- $(C_1-C_6)$ -alkyl-,  $(C_1-C_6)$ -alkoxycarbonyl-,  $(C_1-C_6)$ -alkylcarbonyl-,  $(C_1-C_6)$ -alkylaminocarbonyl-,  $(C_1-C_6)$ -alkoxy- $(C_1-C_6)$ -alkoxy-,  $(C_5-C_{14})$ -arylcarbonyl-,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkylcarbonyl-,  $(C_1-C_6)$ -alkanoylamino-,  $(C_5-C_{14})$ -arylsulfonylamino-,  $(C_1-C_6)$ -alkylsulfonylamino-,  $(C_1-C_6)$ -alkylamino-, di- $((C_1-C_6)$ -alkyl)amino-,  $(C_1-C_6)$ -alkylsulfonyl-,  $(C_1-C_6)$ -
- 20 alkylaminosulfonyl-,  $(C_5-C_{14})$ -arylaminosulfonyl-,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkylaminosulfonyl,  $(C_5-C_{14})$ -arylsulfonyl-,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkylsulfonyl,  $(C_5-C_{14})$ -aryl and  $(C_5-C_{14})$ -heteroaryl, and where all residues  $R^6$  and  $R^{6'}$  are independent of one another and can be identical or different;
- 25  $R^7$  is  $(C_1-C_4)$ -alkanediyl or a direct bond, where all residues  $R^7$  are independent of one another and can be identical or different;

$R^8$  and  $R^{8'}$  are hydroxy,  $(C_1-C_8)$ -alkoxy,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkoxy-,  $(C_5-C_{14})$ -aryloxy,  $(C_1-C_8)$ -alkylcarbonyloxy- $(C_1-C_4)$ -alkoxy-,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -

- 30 alkylcarbonyloxy- $(C_1-C_8)$ -alkoxy-,  $NR^6R^{6'}$ , (di- $((C_1-C_8)$ -alkyl)amino)carbonylmethyloxy-, (di- $((C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl)-amino)carbonylmethyloxy-,  $(C_5-C_{14})$ -aryl-amino-, the residue of an amino acid, N- $((C_1-C_4)$ -alkyl)-piperidin-4-yloxy-, 2-methylsulfonylethoxy-

, 1,3-thiazol-2-ylmethoxy-, 3-pyridylmethoxy-, 2-(di-((C<sub>1</sub>-C<sub>4</sub>)-alkyl)amino)-ethoxy or the residue Q<sup>-</sup> (CH<sub>3</sub>)<sub>3</sub>N<sup>+</sup>-CH<sub>2</sub>-CH<sub>2</sub>-O- in which Q<sup>-</sup> is a physiologically tolerable anion, where all residues R<sup>8</sup> and R<sup>8'</sup> are independent of one another and can be identical or different;

5

n is zero, one, two, three, four or five;

m is zero, one, two, three, four or five;

i is zero or one;

q is zero, one or two;

10 r is zero, one or two;

s is zero, one, two or three;

t is zero, one, two, three, four, five, six, seven or eight;

p is zero, one or two, where all numbers p are independent of one another and can be identical or different;

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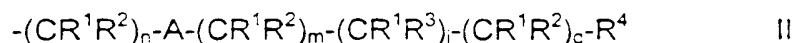
in all their stereoisomeric forms and mixtures thereof in all ratios, and their physiologically tolerable salts and their prodrugs;

where, instead of the purine structure shown in formula I, also a 3-deazapurine structure, a 7-deazapurine structure or a 7-deaza-8-azapurine structure can be present.

20

2. A compound of the formula I as claimed in claim 1, in which

25 G is a residue of the formula II



A is a direct bond, -C(O)NR<sup>5</sup>-, -NR<sup>5</sup>C(O)-, -C(O)-, -NR<sup>5</sup>-, -O-, -S-, -S(O)-, -S(O)<sub>2</sub>-, (C<sub>2</sub>-C<sub>4</sub>)-alkynediyl, (C<sub>2</sub>-C<sub>4</sub>)-alkenediyl, (C<sub>5</sub>-C<sub>14</sub>)-arylene where in the arylene residue one, two, three, four or five ring carbon atoms can be replaced by heteroatoms from the series consisting of nitrogen, oxygen and sulfur, or a divalent residue of a 3-

30

membered to 7-membered saturated or unsaturated ring which can contain one or two ring heteroatoms from the series consisting of nitrogen, sulfur and oxygen and which can be monosubstituted or disubstituted by residues from the series consisting of =O, =S and R<sup>3</sup>;

5

B is (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, fluorine, chlorine, bromine, hydroxy, cyano, trifluoromethyl, nitro, hydroxycarbonyl-, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-, (C<sub>1</sub>-C<sub>6</sub>)-alkylcarbonyl-, (C<sub>5</sub>-C<sub>14</sub>)-  
 10 arylcarbonyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkylcarbonyl-, (C<sub>1</sub>-C<sub>6</sub>)-alkylaminocarbonyl-, (C<sub>1</sub>-C<sub>6</sub>)-alkanoylamino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylsulfonylamino-, (C<sub>5</sub>-C<sub>14</sub>)-arylsulfonylamino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino-, di-((C<sub>1</sub>-C<sub>6</sub>)-alkyl)amino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylsulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-arylsulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkylsulfonyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl or (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, where all residues B are independent of one another and can be identical or different;

15

X is hydrogen, NH<sub>2</sub>, -NH-C(O)-R<sup>6</sup> or OH;

Y is hydrogen;

20 Z is N;

R<sup>1</sup> and R<sup>2</sup> independently of one another are hydrogen, fluorine, chlorine, cyano, nitro, (C<sub>1</sub>-C<sub>10</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-,  
 25 R<sup>6</sup>-O-R<sup>7</sup>, R<sup>6</sup>S(O)<sub>2</sub>NHR<sup>7</sup>, R<sup>6</sup>OC(O)NHR<sup>7</sup> or R<sup>6</sup>R<sup>6'</sup>N-R<sup>7</sup>, where all residues R<sup>1</sup> and R<sup>2</sup> are independent of one another and can be identical or different;

R<sup>3</sup> is hydrogen, fluorine, chlorine, cyano, nitro, (C<sub>1</sub>-C<sub>18</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-  
 30 heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, R<sup>6</sup>-O-R<sup>7</sup>, R<sup>6</sup>R<sup>6'</sup>N-R<sup>7</sup>, R<sup>6</sup>C(O)-O-R<sup>7</sup>, R<sup>6</sup>C(O)R<sup>7</sup>, R<sup>6</sup>OC(O)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)OR<sup>7</sup>, R<sup>6</sup>S(O)<sub>p</sub>N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>OC(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>C(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)C(O)N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>N(R<sup>6'</sup>)S(O)<sub>p</sub>N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>S(O)<sub>p</sub>R<sup>7</sup>,

$R^6SC(O)N(R^5)R^7$ ,  $R^6N(R^{6'})C(O)R^7$  or  $R^6N(R^{6'})S(O)_pR^7$ , where alkyl can be mono-unsaturated or poly-unsaturated and where alkyl, cycloalkyl, aryl and heteroaryl can be monosubstituted or polysubstituted by  $R^6$ , fluorine, chlorine, bromine, cyano, trifluoromethyl,  $R^6R^{6'}NR^7$ , nitro,  $R^6OC(O)R^7$ ,  $R^6C(O)R^7$ ,  $R^6N(R^{6'})C(O)R^7$ ,

- 5  $R^6N(R^{6'})S(O)_pR^7$  or  $R^6-O-R^7$ , and where all residues  $R^3$  are independent of one another and can be identical or different;

$R^4$  is  $-C(O)R^8$  or  $-P(O)R^8R^{8'}$ ;

- 10  $R^5$  is hydrogen,  $(C_1-C_{10})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl- or  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-, where all residues  $R^5$  are independent of one another and can be identical or different;

- $R^6$  and  $R^{6'}$  are hydrogen,  $(C_1-C_{12})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -aryl,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -heteroaryl or  $(C_5-C_{14})$ -heteroaryl- $(C_1-C_8)$ -alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be substituted one, two or three times by identical or different substituents from the series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl, nitro, hydroxycarbonyl-,  $(C_1-C_6)$ -alkyl,  $(C_1-C_6)$ -alkoxy,  $(C_1-C_6)$ -alkoxy- $(C_1-C_6)$ -alkyl-,  $(C_5-$   
 15  $C_{14})$ -arylcarbonyl-,  $(C_5-C_{14})$ -aryl- $(C_1-C_6)$ -alkylcarbonyl-,  $(C_1-C_6)$ -alkanoylamino-,  $(C_5-C_{14})$ -arylsulfonylamino-,  $(C_1-C_6)$ -alkylsulfonylamino-,  $(C_1-C_6)$ -alkylamino-, di- $((C_1-C_6)$ -alkyl)amino-,  $(C_1-C_6)$ -alkylsulfonyl-,  $(C_5-C_{14})$ -aryl and  $(C_5-C_{14})$ -heteroaryl, and where all residues  $R^6$  and  $R^{6'}$  are independent of one another and can be identical or  
 20 different;

25

$R^7$  is  $(C_1-C_4)$ -alkanediyl or a direct bond, where all residues  $R^7$  are independent of one another and can be identical or different;

- $R^8$  and  $R^{8'}$  are hydroxy,  $(C_1-C_8)$ -alkoxy,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkoxy-,  $(C_1-C_8)$ -alkylcarbonyloxy- $(C_1-C_4)$ -alkoxy- or  $NR^6R^{6'}$  where all residues  $R^8$  and  $R^{8'}$  are  
 30 independent of one another and can be identical or different;

n is zero, one, two, three, four or five;

m is zero, one, two, three, four or five;

i is zero or one;

5 q is zero, one or two;

r is zero, one or two;

s is zero, one, two or three;

t is zero, one, two, three, four, five, six, seven or eight;

p is zero, one or two, where all numbers p are independent of one another and can  
10 be identical or different;

in all their stereoisomeric forms and mixtures thereof in all ratios, and their  
physiologically tolerable salts and their prodrugs.

15 3. A compound of the formula I as claimed in claims 1 and/or 2, in which

G is a residue of the formula II



20

A is a direct bond, -C(O)NR<sup>5</sup>-, -NR<sup>5</sup>C(O)-, -C(O)-, -NR<sup>5</sup>- or (C<sub>5</sub>-C<sub>14</sub>)-arylene where in  
the arylene residue one or two ring carbon atoms can be replaced by heteroatoms  
from the series consisting of nitrogen, oxygen and sulfur;

25 B is (C<sub>1</sub>-C<sub>6</sub>)-alkyl, chlorine, hydroxy, cyano, trifluoromethyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-  
alkylcarbonyl-, (C<sub>1</sub>-C<sub>6</sub>)-alkanoylamino-, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino- or di-((C<sub>1</sub>-C<sub>6</sub>)-  
alkyl)amino-, where all residues B are independent of one another and can be  
identical or different;

30 X is hydrogen;

Y is hydrogen;

Z is N;

$R^1$  and  $R^2$  are hydrogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl,  $R^6S(O)_2NHR^7$  or  $R^6OC(O)NHR^7$ , where all  
5 residues  $R^1$  and  $R^2$  are independent of one another and can be identical or different;

$R^3$  is hydrogen, (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-,  
(C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-  
C<sub>6</sub>)-alkyl-,  $R^6R^{6'}N-R^7$ ,  $R^6S(O)_2N(R^5)R^7$ ,  $R^6OC(O)N(R^5)R^7$  or  $R^6C(O)N(R^5)R^7$ , where  
10 alkyl can be mono-unsaturated or poly-unsaturated and where alkyl, cycloalkyl, aryl  
and heteroaryl can be monosubstituted or polysubstituted by  $R^6$ , fluorine, chlorine,  
trifluoromethyl,  $R^6C(O)R^7$  or  $R^6-O-R^7$ ;

$R^4$  is -C(O) $R^8$ ;

15

$R^5$  is hydrogen or (C<sub>1</sub>-C<sub>4</sub>)-alkyl, where all residues  $R^5$  are independent of one another  
and can be identical or different;

$R^6$  and  $R^{6'}$  are hydrogen, (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-  
20 C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl or (C<sub>5</sub>-C<sub>14</sub>)-  
heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be  
substituted one, two or three times by identical or different substituents from the  
series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl,  
(C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino-, di-((C<sub>1</sub>-C<sub>6</sub>)-alkyl)amino-, (C<sub>5</sub>-C<sub>14</sub>)-aryl and (C<sub>5</sub>-  
25 C<sub>14</sub>)-heteroaryl, and where all residues  $R^6$  and  $R^{6'}$  are independent of one another  
and can be identical or different;

$R^7$  is (C<sub>1</sub>-C<sub>2</sub>)-alkanediyl or a direct bond, where all residues  $R^7$  are independent of  
one another and can be identical or different;

30

$R^8$  is hydroxy or (C<sub>1</sub>-C<sub>6</sub>)-alkoxy;



n is zero, one, two, three, four or five;

m is zero or one;

i is zero or one;

q is zero or one;

5 r is zero or one;

s is zero, one or two;

t is zero, one, two, three or four;

10 in all their stereoisomeric forms and mixtures thereof in all ratios, and their  
physiologically tolerable salts and their prodrugs.

4. A compound of the formula I as claimed in one or more of claims 1 to 3, in which

G is a residue of the formula II

15



A is a direct bond;

20 B is (C<sub>1</sub>-C<sub>6</sub>)-alkyl or hydroxy, where all residues B are independent of one another  
and can be identical or different;

X is hydrogen;

25 Y is hydrogen;

Z is N;

30 R<sup>1</sup> and R<sup>2</sup> are hydrogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, R<sup>6</sup>S(O)<sub>2</sub>NHR<sup>7</sup> or R<sup>6</sup>OC(O)NHR<sup>7</sup>, where all  
residues R<sup>1</sup> and R<sup>2</sup> are independent of one another and can be identical or different;

$R^3$  is hydrogen, (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>6</sub>)-alkyl-,  $R^6R^6N-R^7$ ,  $R^6S(O)_2N(R^5)R^7$ ,  $R^6OC(O)N(R^5)R^7$  or  $R^6C(O)N(R^5)R^7$ , where alkyl can be mono-unsaturated or poly-unsaturated and where alkyl, cycloalkyl, aryl and heteroaryl can be monosubstituted or polysubstituted by  $R^6$ , fluorine, chlorine, trifluoromethyl,  $R^6C(O)R^7$  or  $R^6-O-R^7$ ;

$R^4$  is -C(O) $R^6$ ;

10  $R^5$  is hydrogen or (C<sub>1</sub>-C<sub>4</sub>)-alkyl;

$R^6$  and  $R^{6'}$  are hydrogen, (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl or (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be substituted one, two or three times by identical or different substituents from the series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino-, di-((C<sub>1</sub>-C<sub>6</sub>)-alkyl)amino-, (C<sub>5</sub>-C<sub>14</sub>)-aryl and (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl, and where all residues  $R^6$  and  $R^{6'}$  are independent of one another and can be identical or different;

20

$R^7$  is a direct bond;

$R^8$  is hydroxy or (C<sub>1</sub>-C<sub>4</sub>)-alkoxy;

25 n is zero, one or two;

m is zero or one;

i is zero or one;

q is zero or one;

r is zero or one;

30 s is zero, one or two;

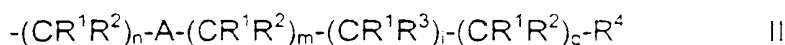
t is zero;

in all their stereoisomeric forms and mixtures thereof in all ratios, and their physiologically tolerable salts and their prodrugs.

5. A compound of the formula I as claimed in one or more of claims 1 to 4, which is a

5

G is a residue of the formula II



10 A is a direct bond;

X is hydrogen;

Y is hydrogen;

15

Z is N;

R<sup>1</sup> and R<sup>2</sup> are hydrogen or (C<sub>1</sub>-C<sub>2</sub>)-alkyl, where all residues R<sup>1</sup> and R<sup>2</sup> are independent of one another and can be identical or different;

20

R<sup>3</sup> is R<sup>6</sup>R<sup>6'</sup>N-R<sup>7</sup>, R<sup>6</sup>S(O)<sub>2</sub>N(R<sup>5</sup>)R<sup>7</sup>, R<sup>6</sup>OC(O)N(R<sup>5</sup>)R<sup>7</sup> or R<sup>6</sup>C(O)N(R<sup>5</sup>)R<sup>7</sup>;

R<sup>4</sup> is -C(O)R<sup>8</sup>;

25 R<sup>5</sup> is hydrogen or (C<sub>1</sub>-C<sub>2</sub>)-alkyl;

R<sup>6</sup> and R<sup>6'</sup> are hydrogen, (C<sub>1</sub>-C<sub>12</sub>)-alkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl, (C<sub>3</sub>-C<sub>14</sub>)-cycloalkyl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-aryl, (C<sub>5</sub>-C<sub>14</sub>)-aryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl-, (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl or (C<sub>5</sub>-C<sub>14</sub>)-heteroaryl-(C<sub>1</sub>-C<sub>8</sub>)-alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be

30

substituted one, two or three times by identical or different substituents from the series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino-, di-((C<sub>1</sub>-C<sub>6</sub>)-alkyl)amino-, (C<sub>5</sub>-C<sub>14</sub>)-aryl and (C<sub>5</sub>-

C<sub>14</sub>)-heteroaryl, and where the residues R<sup>6</sup> and R<sup>6</sup> are independent of one another and can be identical or different;

R<sup>7</sup> is a direct bond;

5

R<sup>8</sup> is hydroxy or (C<sub>1</sub>-C<sub>4</sub>)-alkoxy;

n is zero, one or two;

m is zero or one;

10 i is zero or one;

q is zero or one;

r is zero;

s is zero;

t is zero;

15

in all their stereoisomeric forms and mixtures thereof in all ratios, and their physiologically tolerable salts and their prodrugs

6. A compound of the formula I as claimed in one or more of claims 1 to 5, which is a

20

G is a residue of the formula II



25 A is a direct bond;

X is hydrogen;

Y is hydrogen;

30

Z is N;

$R^1$  and  $R^2$  are hydrogen;

$R^3$  is  $R^6S(O)_2N(R^5)R^7$  or  $R^6OC(O)N(R^5)R^7$ ;

5  $R^4$  is  $-C(O)R^8$ ;

$R^5$  is hydrogen;

10  $R^6$  is  $(C_1-C_{12})$ -alkyl,  $(C_3-C_{14})$ -cycloalkyl,  $(C_3-C_{14})$ -cycloalkyl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -aryl,  $(C_5-C_{14})$ -aryl- $(C_1-C_8)$ -alkyl-,  $(C_5-C_{14})$ -heteroaryl or  $(C_5-C_{14})$ -heteroaryl- $(C_1-C_8)$ -alkyl- where aryl, heteroaryl, cycloalkyl and alkyl can be substituted one, two or three times by identical or different substituents from the series consisting of fluorine, chlorine, bromine, cyano, trifluoromethyl,  $(C_1-C_6)$ -alkyl,  $(C_1-C_6)$ -alkoxy,  $(C_1-C_6)$ -alkylamino-, di- $((C_1-C_6)$ -alkyl)amino-,  $(C_5-C_{14})$ -aryl and  $(C_5-C_{14})$ -heteroaryl;

15

$R^7$  is a direct bond;

$R^8$  is hydroxy or  $(C_1-C_4)$ -alkoxy;

20 n is one;

m is zero;

i is one;

q is zero;

r is zero;

25 s is zero;

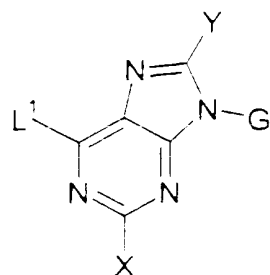
t is zero;

in all their stereoisomeric forms and mixtures thereof in all ratios, and their physiologically tolerable salts and their prodrugs

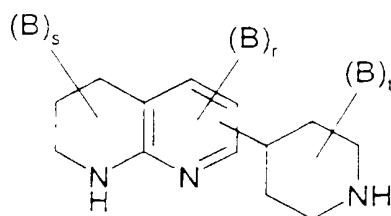
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7. A process for the preparation of a compound as claimed in one or more of claims 1 to 6, comprising reacting a compound of the formula VI with a compound of the

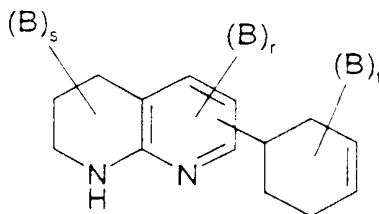
formula VIIa or with a compound of the formula VIIb



VI



VIIa



VIIb

- 5 wherein  $L^1$  is a leaving group and B, G, X, Y, r, s and t are defined as in claims 1 to 6 but wherein functional groups can also be present in the form of precursor groups or in protected form.
8. A pharmaceutical composition, comprising at least one compound of the formula I
- 10 as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts and/or its prodrugs and a pharmaceutically acceptable carrier.
9. A compound of the formula I as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts and/or its prodrugs for use as a vitronectin receptor
- 15 antagonist.
10. A compound of the formula I as claimed in one or more of claims 1 to 6 and/or its physiologically tolerable salts and/or its prodrugs for use as an inhibitor of bone resorption, for the therapy or prophylaxis of osteoporosis, as an inhibitor of tumor
- 20 growth or tumor metastasis, as an antiinflammatory, or for the therapy or prophylaxis of cardiovascular disorders, restenoses, arteriosclerosis, nephropathies, retinopathies, psoriasis or rheumatoid arthritis.